



General Certificate of Secondary Education

Design and Technology (Resistant Materials Technology) Foundation Tier 3555/F

Mark Scheme

2006 examination – June series

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Question 1

Any **three** correctly identified requirements

Possible responses:

Do not accept repeat of “brightly coloured”

Must be entertaining / interesting

Must be soundly constructed

Must be capable of being manufactured in quantity

Must be safe to use

Must be made from non toxic materials

Must have no small / detachable parts

Must be educational

Weight related responses

Ergonomic/anthropometric related responses

3 x 1 mark **3 marks**

NB. Avoid obvious repeats

Three correct explanations

3 x 1 mark **3 marks**

6 marks

Question 2

One answer provides enough evidence to award full marks for sketches and notes

Quality of sketches

Quality 3D rendered sketches	<i>4 – 5 marks</i>
Line sketches or an attempt at 3D sketches	<i>2 - 3 marks</i>
Simple line sketching	<i>1 mark</i>

Quality of notes

Detailed explanation	<i>5 – 6 marks</i>
Simple explanation - descriptive	<i>3 – 4 marks</i>
Labelling	<i>1 - 2 marks</i>

Variety of ideas

Mark each idea separately against the following scheme

An excellent idea which, differs in approach or principal, fulfils the design brief, specification and shows originality	<i>6 marks</i>
A very good idea which differs in approach or principal, fulfils the design brief and the specification	<i>5 marks</i>
A good idea which differs in approach or principle, fulfils most of the design brief and specification	<i>4 marks</i>
An idea which differs in approach or principle, fulfils some of the design brief and the specification	<i>3 marks</i>
Own idea which is very similar to the other ideas with some development	<i>2 marks</i>
Own idea which is very similar to the other ideas	<i>1 mark</i>
(2 similar shape toys would not achieve full marks but different shape sorters may) (Close copies of abacus from the insert sheet with development max <i>1 mark</i>) (Close copies of abacus from the insert sheet max <i>0 marks</i>)	

2 x 6 marks

23 marks

Question 3

- (a) Any **two** correct reasons required which relate to the performance of the design
No need to qualify

2 x 1 marks

“Better” on its own

0 marks

2 marks

- (b) Any **two** correctly circled modelling/prototyping materials.

Possible responses:

Criteria: must be cheap and or compliant

Balsa

Steel

Card

Aluminium

Mahogany

M D F

If more than 2 circled

2 x 1 marks

0 marks

2 marks

4 marks

Question 4

- (a) Designs could be made from wood, metal or plastic.

Plastic

Award **one** mark for the generic term plastic.

Award **two** marks for any suitable specific plastic.

Material - Possible responses:

ABS

GRP

HIPS

Polycarbonate PC

Polypropylene PP

HDPE

PVC

Acrylic

2 marks

Metal

Award **one** mark for the generic term metal.

Award **two** marks for any suitable specific metal.

Material - Possible responses:

Steel

Aluminium

Brass

2 marks

Wood

Award **one** mark for the generic term wood.

Award **two** marks for any suitable hardwood / softwood / manufactured board.

Material - Possible responses:

Beech

Ash

Oak

Teak

Mahogany

Pine

Plywood

MDF

2 marks

6 marks

(b) Use the descriptors below to award marks.

Quality of notes and sketches

Detailed notes and quality sketches

3 - 4 marks

Simple notes and sketches

1 - 2 marks

Marking out traditional

Sufficient detail for most of the design to be marked out by a third party, most tools and equipment given.

3 - 4 marks

Sufficient detail for some of the design to be marked out by a third party, some tools and equipment given

1 - 2 marks

or

Marking out CAD

Screen

1 mark

With image

1 mark

Mouse

1 mark

Suitable graphics package eg: ProDesktop

2D Design Corel Draw

1 mark

Drilling traditional

Sufficient detail for most of the frame to be drilled by a third party, most tools and equipment given.

3 - 4 marks

Sufficient detail for some of the design to be drilled by a third party, some tools and equipment given

1 - 2 marks

or

Drilling CAM

Transfer of data to

1 mark

Laser cutter or CNC router sketch or described

1 mark

Process described

1 mark

Laid or held on bed - vacuum or cramp

1 mark

Safety points

1 mark

max 4 marks

Shaping traditional

Sufficient detail for most of the design to be shaped by a third party, most tools and equipment given.

3 - 4 marks

Sufficient detail for some of the design to be shaped by a third party, some tools and equipment given

1 - 2 marks

or

Shaping CAM

Transfer of data to	<i>1 mark</i>	
Laser cutter or CNC router sketch or described	<i>1 mark</i>	
Process described	<i>1 mark</i>	
Laid or held on bed - vacuum or cramp	<i>1 mark</i>	
Safety points	<i>1 mark</i>	<i>max 4 marks</i>

Finishing

Sufficient detail for most of the design to be finished by a third party, most tools and equipment given	<i>3 - 4 marks</i>
Sufficient detail for some of the design to be finished by a third party, some tools and equipment given	<i>1 - 2 marks</i>
A work piece coming from laser cutter or router is good enough to satisfy	<i>2 marks</i>
A work piece coming from laser cutter or router is Not good enough to satisfy and needs further finishing which is described	<i>4 marks</i>

Assembly of the abacus is not part of the question and cannot be considered as a “finishing” process.

22 marks

Question 5

Award **one** mark for each correct answer

Hazard	Risk to user	Precaution
Picking up hot plastic	You could burn your hands	Wear heat protective gloves / gauntlets Use tongs
Hot plastics give off fumes	Could be poisoned You could damage your respiratory system	Ensure the area is well ventilated by opening windows, switching on an air extraction system. Wear mask of any type
Plastic adhesive touches your clothing	You could damage your clothing	Wear an apron (leather)

6 marks

Question 6

- (a) **High chair A** - Award **one** mark for the generic term wood / plywood
- Award **two** marks for a suitable solid / laminated wood

Material - Possible responses:

Pine
Beech
Oak
Ash
Mahogany *2 marks*

Reasons - Possible responses:

Attractive
Strong
Durable
Capable of being bent
Qualified cost *1 mark*

Cheap *0 marks*

- High chair B** - Award **one** mark for the generic term plastic thermo-set thermo-plastic
- Award **two** marks for any suitable specific plastic.

Material - Possible responses:

ABS
HIPS
Polycarbonate PC
Polypropylene PP
HDPE
PVC
GRP (fibreglass) *2 marks*

Acrylic *0 marks*

Reasons - Possible responses:

Immaculate surface finish
Self coloured
Ideal for quantity production / easily moulded
Hygiene related response / wipe clean
Durable
Strong *1 mark*

6 marks

(b) **High chair A**

Award **one** mark for a low level response e.g.

Varnish
Paint
Polish

Award **two** marks for any suitable specific finish e.g.

Wax
Polyurethane / acrylic varnish
Stain
Natural
Spray paint

2 marks **2 marks**

8 marks

Question 7

(a) Award **one** mark each for a correct answer.

Possible responses:

Investigate existing products
Send e mails
Any communication between designer, manufacturer & customer
Order materials
Market research
Advertise the product

3 x 1 mark **3 marks**

Avoid obvious repetition

(b) Award **one** mark each for a correct advantage.

More professional quality
More accurate
Quicker to edit (cut, copy, resize)
Easier to apply a rendering
Can be stored electronically
Can be sent electronically

3 x 1 mark

Quicker easy to use (must be qualified)

0 marks **3 marks**

Avoid obvious repetition

6 marks

Question 8

Award **one** mark for each correct tool letter.

Award **one** mark for each correctly named tool.

Saw cut	Tool letter	Tool name
1	C	Coping saw
2	B	Panel saw Hand saw Rip/cross cut
3	A	Tenon saw Dovetail saw

6 marks

Question 9

(a) Award **one** mark each for **two** correctly identified reasons.

Possible responses:

The child would fall off

There is no back / head support

The seat is too big

There is nothing for the child to hold onto

The child is unlikely to be able to hold on themselves *2 x 1 mark*

Award **one** mark each for **two** suitable explanations. *2 x 1 mark* **4 marks**

(b) Quality sketch with notes *2 marks*

Simple sketch *1 mark*

Award **one** mark each for any of the following features:

Restraining straps

Back support

Head support

Front restraining bar

Moulded seat

Hand grips

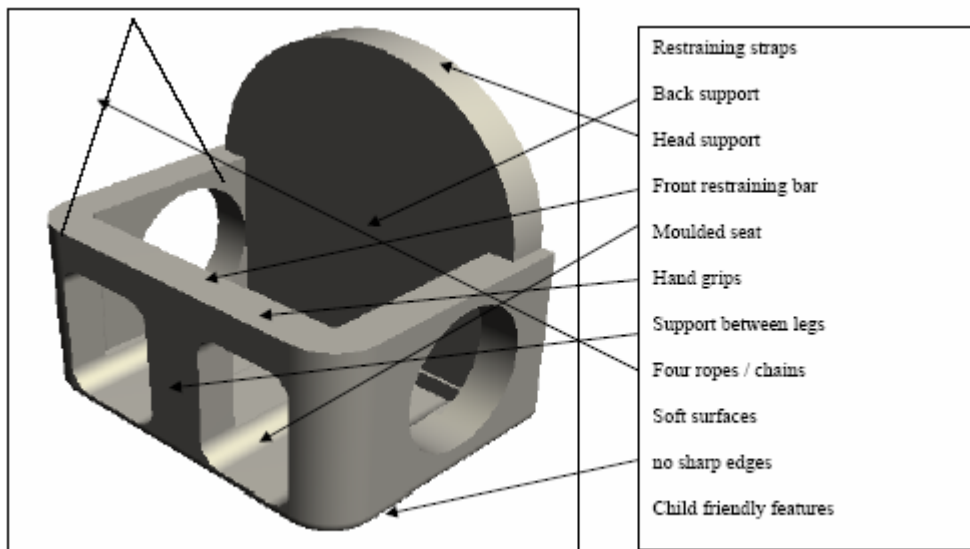
Support between legs to stop slipping

Four ropes/chains for stability

Soft surfaces no sharp edges

Child friendly features – graphics colours *6 x 1 mark* **8 marks**

12 marks



Question 10

- (a) Award **one** mark for each correctly entered blank.

Plastic is a **n o n - r e n e w a b l e** resource. To save the environment we must **r e d u c e** the amount of plastic we use. We must also **r e c y c l e** waste plastic.

3 x 1 mark **3 marks**

- (b) Award **one** mark each for **two** correct reasons.

Possible responses:

Converts CO₂ into O

Less energy used in production

Bio-degradable

Is a renewable resource – plant 2 for 1

Provides a habitat for flora and fauna

Does not pollute the atmosphere

2 x 1 mark

Award **one** mark each for **two** suitable explanations

2 x 1 mark **4 marks**

7 marks